12. A method of manufacturing a fluorocarbon-based polymer coating film comprising the steps of:

a. contacting a substrate having a surface containing hydroxyl groups with a non-aqueous solvent comprising a material comprising chlorosilyl groups to form a siloxane-based film on the substrate surface; and

b. coating the siloxane-based film with either (1) a non-aqueous solvent comprising a compound comprising a fluorocarbon group and a chlorosilyl group or (2) a solvent comprising a compound comprising a fluorocarbon group and an alkoxysilyl group.

13. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein the substrate is made of the member of a group consisting of glass, metals, plastics, and ceramics.

14. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein the substrate is made of a plastic material treated in a plasma atmosphere containing oxygen.

15. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein said material comprising chlorosilyl groups is selected from the group consisting of $SiCl_4$, $SiHCl_3$, SiH_2Cl_2 and $Cl\text{-}(SiCl_2O)_n\text{-}SiCl_3$, wherein n is an integer.

16. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein said compound comprising a fluorocarbon group and a chlorosilyl group is represented by a formula: $CF_3\text{-}(CF_2)_n\text{-}(R)_m\text{-}SiX_pCl_{3-p}$ where n represents 0 or an integer; R represents an alkylene group or a hydrocarbon substituted group containing C=C or C≡C, a silicon atom or an oxygen atom; m represents 0 or 1, X

represents a hydrogen atom, an alkyl group, an alkoxy group, a fluorine-containing alkoxy group or a fluorine-containing alkyl group; p represents 0, 1 or 2.

17. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein the compound comprising a fluorocarbon group and a chlorosilyl group is represented by:

$$CF_3\text{-}(CF_2)_n\text{-}(R)_m\text{-}SiY_q(OA')_{3-q}$$

where n represents 0 or an integer;

R represents an alkylene group or a hydrocarbon substituted group containing C=C or C≡C, a silicon atom or an oxygen atom;

m represents 0 or 1;

Y represents a hydrogen atom, an alkyl group, an alkoxy group, a fluorine-containing alkoxy group or a fluorine-containing alkyl group;

OA' represents an alkoxy group; and

q' represents 0, 1 or 2;

and the method further comprises a step of baking the substrate after coating.

18. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 16, wherein a material represented by a formula: SiX_sCl_{4-s} where X represents a hydrogen atom or an alkyl group, and s represents 0, 1 or 2; is added to the solvent of (1).

19. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein a material represented by a formula:

$$SiY_t(OA'')_{4-t}$$

where Y represents an alkyl group; A'' represents a hydrogen atom or an alkyl group; and t represents 0, 1, and 2; is added to the solvent of (2).

20. The method of manufacturing the fluorocarbon-based polymer coating film according to claim 12, wherein fine particles of a fluorocarbon-based polymer are dispersed in advance in either said non-aqueous solvent containing the compound comprising a fluorocarbon group and a chlorosilyl group or said solvent containing the compound comprising a fluorocarbon group and an alkoxysilyl group.

21. A method of producing a non-wetting surface on a glass substrate comprising the steps of:

a. depositing a siloxane-based primer layer on a surface of the glass; and

b. coating the siloxane-based primer layer with a composition comprising a perfluoroalkyl alkyl silane.

22. A product made by the process of claim 16.

23. A product made by the process of claim 17.

24. A product made by the process of claim 18.

25. A product made by the process of claim 19.

26. A product made by the process of claim 21.